

# PATENT SPECIFICATION

(11) 1 280 301

## DRAWINGS ATTACHED

1 280 301

(21) Application No. 16504/69 (22) Filed 28 March 1969

(23) Complete Specification filed 24 March 1970

(45) Complete Specification published 5 July 1972

(51) International Classification F16F 13/00

(52) Index at acceptance

F2S 10C1 10D2

(72) Inventors ROBERT MUNRO and TIMOTHY JOHN BLEE



## (54) IMPROVEMENTS RELATING TO DAMPING

(71) We, ASSOCIATED ENGINEERING LIMITED, a British Company, of 60, Kenilworth Road, Leamington Spa, Warwickshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to dampers.

According to this invention, there is provided a combined damper and springing system, the damper comprising a casing, a rod extending into or through the casing for movement relative to the casing and provided with projecting parts, and the casing being substantially filled with pulverulent or granular material, so that on movement of the rod relative to the casing the passage of the projecting parts through the pulverulent or granular material causes dissipation of energy, and resilient means arranged to be loaded by said movement of the rod to compress said pulverulent or granular material.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawing which shows an embodiment of damper and springing mechanism.

Referring to the drawing, the damper has a two-part casing, including an outer casing member 11 within which telescopes an inner casing member 12. The outer member 11 is formed with a recess 13 at one end to receive the inner casing member 12. The casing member 11 has an end wall 14 and the casing member 12 an end wall 15, both end walls 14, 15 having a central aperture through which passes a rod member 16. The rod member is formed with four corrugated vanes 17 which move in the chamber defined by casing members 11, 12 this chamber being filled with shot 18. Seals 19, 20 are provided around the rod 16 where it passes through the holes in the end walls 14, 15.

The end wall 15 is fixed, for example to the structure of a vehicle, and the rod 16 moves relative to it. A spring carrier flange

21 is fixed to the rod and a helical spring 22 is positioned between the flange 21 and flange 23 on the casing 11. The spring acts both as a suspension spring and to pressurise the shot within the casing member 11.

Thus when the rod 16 is deflected upward relative to the end wall member 15, the vanes 17 travel through the packed shot 18 in the chamber, and the spring 22 is compressed between flanges 21 and 23 and causes the casing member 11 to move upward relative to casing member 12 and further compresses the shot in the chamber. It will be evident that the greater the upward deflection of the rod 16, the greater will be the force applied through the spring 22 and casing member 11 to the shot 18 in the chamber.

## WHAT WE CLAIM IS:—

1. A combined damper and springing system wherein the damper comprises a casing, a rod extending into or through the casing for movement relative to the casing and provided with projecting parts, the casing being substantially filled with pulverulent or granular material, so that on movement of the rod relative to the casing the passage of the projecting parts through the pulverulent or granular material causes dissipation of energy, and resilient means arranged to be loaded by said movement of the rod to compress said pulverulent or granular material.

2. A system as claimed in claim 1 wherein the casing is tubular and includes members which are relatively moveable to vary the pressure on the pulverulent or granular material, and the rod is arranged along the longitudinal axis of the casing.

3. A system as claimed in claim 2 wherein the rod is moveable longitudinally relative to the casing members, the projecting parts are vanes and the resilient means is operatively arranged between one of the casing members and the rod.

4. A system as claimed in either claim 2

[Price 25p]

or claim 3 wherein the members are telescopically arranged tubular casing members.

substantially as described with reference to the accompanying drawing.

5. A system as claimed in any one of claims 2 to 4 wherein the resilient means is

BARON & WARREN,  
16, Kensington Square,  
London, W.8.

5 a helical spring.

6. A system as claimed in claim 1 and

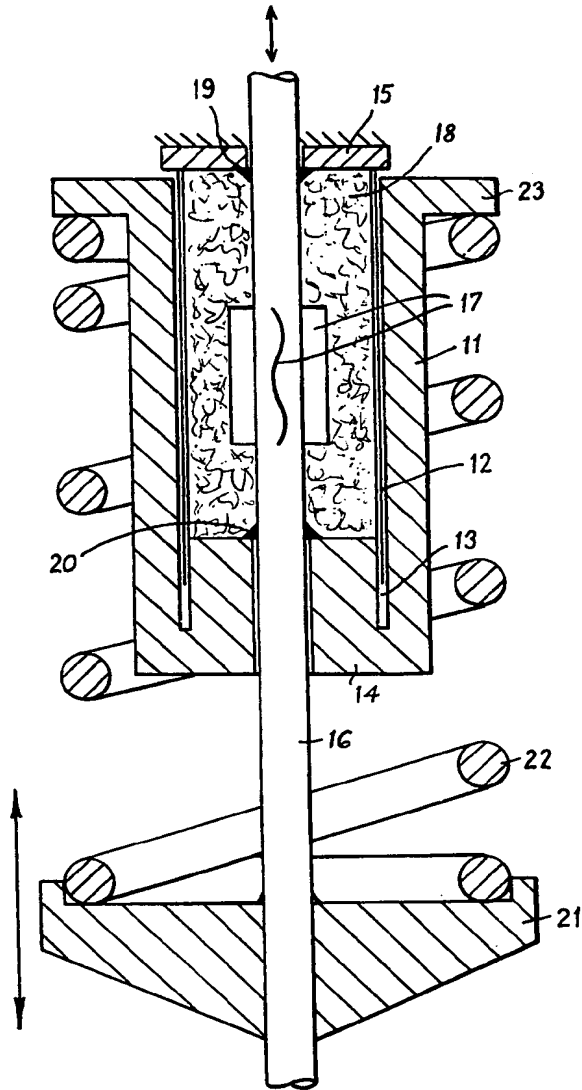
Chartered Patent Agents.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon). Ltd.—1972.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,  
from which copies may be obtained.

1280301 COMPLETE SPECIFICATION

1 SHEET

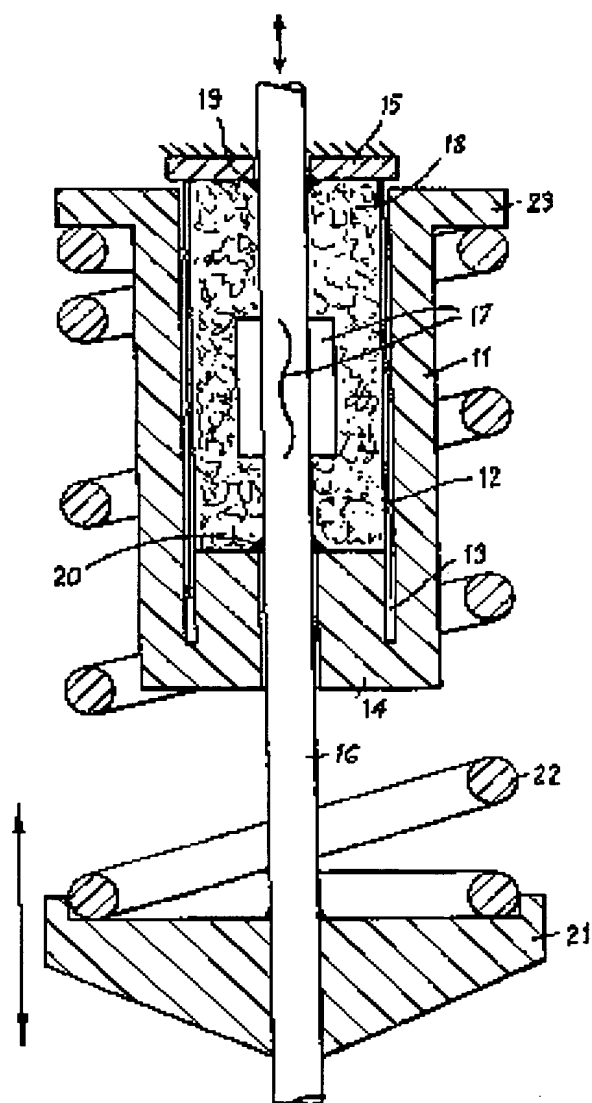
*This drawing is a reproduction of  
the Original on a reduced scale*



THIS PAGE (32710)

## COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale



THIS PAGE  
NOT REPRODUCED